



Sentiment Analysis

A Probabilistic Approach

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Outline

- 1 The goal
- 2 Approach
- 3 Data Preprocessing
- 4 Classification
- 5 Webserver Framework
- 6 Conclusion



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The goal of the project

Project Description

Performing sentiment analysis on messages about the EO

- Classification Sentiment vs. Non Sentiment
- Classification Positive vs. Negative



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Approach

- Preprocessing of the data
- Perform machine learning algorithms on data
- Use the best algorithm to server



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3 Data Preprocessing

- Dataset Analysis
- Data Cleaning
- Data Reduction
- Data Manipulation



Dataset Analysis

Dataset messages EO

10.000 messages, 19 features per message

Only 3 features used:

- Source
- Sentiment
- Message contents



Data Cleaning

- Shorten words, ex. hahaha to haha
- Stemmer



Data Reduction

- Only use Twitter messages (83% of all messages)
- Remove articles, reference words and prepositions
- Substitute smileys with words
- Remove some punctuation marks (ex. not ! ?)



Data Manipulation

- Create tokens
- Assign sentiment probabilities to tokens

$$P(word) = \frac{\sum word \in C_1}{\sum word \in C_1 \cup C_2} \quad (1)$$



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Outline

4 Classification

- Perceptron
- Support Vector Machine
- Naive Bayes
- Multiclassification with Perceptron
- Entropy
- Neural Network



Classification



Perceptron

Perceptron



Results



Support Vector Machine



Results



Naive Bayes



Results



Multiclassification with Perceptron

Multiclassification with Perceptron



Results



Entropy



Entropy

Results



Neural Network



Results



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Webserver Framework

Request (HTML) → Server (PHP/PYTHON) → Result (XML)

Request `http://url.com/?dataset=1&message=De EO is cool!`

Result XML File (Containing: Status, Message, Sentiment, Accuracy, Precision, Recall)



Demo

Action...



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Conclusion



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